C L A I M S

1. A method of controlling the production of a liquefied natural gas product stream obtained by removing heat from natural gas in a heat exchanger in which the natural gas is in indirect heat exchange with expanded heavy mixed refrigerant and expanded light mixed refrigerant, which method comprises the steps of:

a) measuring the temperature and the flow rate of the liquefied natural gas product stream and measuring the flow rates of the heavy mixed refrigerant and of the light mixed refrigerant;

b) selecting the flow rate of one of the refrigerants (the heavy mixed refrigerant, the light mixed refrigerant or the total mixed refrigerant) to have an operator manipulated set point, and generating a first output signal for adjusting the flow rate of the heavy mixed refrigerant and a second output signal for adjusting the flow rate of the light mixed refrigerant using (i) the operator manipulated set point for the flow rate of the one of the refrigerants, (ii) the flow rates of the heavy and light mixed refrigerants and (iii) an operator manipulated set point for the ratio of the flow rate of the heavy mixed refrigerant to the flow rate of the light mixed refrigerant;

c) adjusting the flow rates of the heavy mixed refrigerant and the light mixed refrigerant in accordance with the first and second output signals;

d) determining a dependent set point for the ratio of the flow rate of the liquefied natural gas product stream to the flow rate of one of the refrigerants such that the temperature of the liquefied natural gas product stream is maintained at an operator manipulated set point, and

determining a dependent set point for the flow rate of the liquefied natural gas product stream using (i) the dependent set point for the ratio of the flow rate of the liquefied natural gas product stream to the flow rate of the one of the refrigerants and (ii) the flow rate of the one of the refrigerants; and

e) maintaining the flow rate of the liquefied natural gas product stream at its dependent set point.

2. The method according to claim 1, wherein controlling the flow rate of the liquefied natural gas product stream according to step d) is overridden by determining a dependent set point for the flow rate of the liquefied natural gas product stream such that the temperature of the liquefied natural gas is maintained at an operator manipulated set point.

3. The method according to claim 1 or 2, wherein step b) comprises selecting the flow rate of the heavy mixed refrigerant to have an operator manipulated set point, generating a first output signal for adjusting the flow rate of the heavy mixed refrigerant using the operator manipulated set point for the flow rate of the heavy mixed refrigerant, generating a second output signal for adjusting the flow rate of the light mixed refrigerant using (i) the flow rates of the heavy mixed refrigerant and the light mixed refrigerant and (ii) an operator manipulated set point for the ratio of the flow rate of the heavy mixed refrigerant to the flow rate of the light mixed refrigerant.

4. The method according to claim 1 or 2, wherein step b) comprises selecting the flow rate of the light mixed refrigerant to have an operator manipulated set point, generating a second output signal for adjusting the flow rate of the light mixed refrigerant using the operator manipulated set point for the flow rate of the light mixed refrigerant, and generating a first output signal

for adjusting the flow rate of the heavy mixed refrigerant using (i) the flow rates of the heavy mixed refrigerant and the light mixed refrigerant and (ii) an operator manipulated set point for the ratio of the flow rate of the heavy mixed refrigerant to the flow rate of the light mixed refrigerant.

5. The method according to claim 1 or 2, wherein step b) comprises selecting the flow rate of the total mixed refrigerant to have an operator manipulated set point, and generating a first output signal for adjusting the flow rate of the heavy mixed refrigerant and a second output signal for adjusting the flow rate of the light mixed refrigerant using (i) the operator manipulated set point for the flow rate of the total mixed refrigerant, (ii) the flow rates of the heavy and light mixed refrigerants and (iii) an operator manipulated set point for the ratio of the flow rate of the heavy mixed refrigerant to the flow rate of the light mixed refrigerant.

6. The method according to any one of the claims 1-5, wherein the one of the refrigerants in step d) is the heavy mixed refrigerant.

7. The method according to any one of the claims 1-5, wherein the one of the refrigerants in step d) is the light mixed refrigerant.

8. The method according to any one of the claims 1-5, wherein the one of the refrigerants in step d) is the total mixed refrigerant.

9. The method according to any one of the claims 1-5, wherein step d) comprises generating an output signal using (i) an operator manipulated set point for the ratio of the flow rate of the liquefied natural gas product stream to the flow rate of one of the refrigerants and (ii) the flow rate of the one of the refrigerants; generating a second output signal using an operator

manipulated set point for the temperature and the measured temperature; and multiplying the output signals with a weighting factor and adding the weighted signals to obtain a dependent set point for the flow rate of the liquefied natural gas product stream.

10. The method according to claim 9, wherein the one of the refrigerants is the heavy mixed refrigerant.

11. The method according to claim 9, wherein the one of the refrigerants is the light mixed refrigerant.

12. The method according to claim 9, wherein the one of the refrigerants is the total mixed refrigerant.

13. The method according to any one of the claims 1-12, wherein the mixed refrigerant used to remove heat from the natural gas is compressed by a compressor driven by a suitable driver, which method further comprises the steps of measuring the power delivered by the driver, and overriding the operator manipulated set point for the flow rate of one of the refrigerants of step b) if the power has reached a predetermined maximum value, in order that the operator manipulated set point for the flow rate of one of the refrigerants can no longer be increased.

14. The method according to claim 13, wherein the driver is a gas turbine, and wherein the temperature of the gas at the exhaust of the gas turbine is used as a measure of the power of the driver.

15. The method of controlling the production of a liquefied natural gas product stream obtained by removing heat from natural gas in two parallel heat exchangers, wherein in each of the heat exchangers the natural gas is in indirect heat exchange with expanded heavy mixed refrigerant and expanded light mixed refrigerant, wherein the liquefied gas from the two heat exchangers is combined to form the liquefied natural gas product stream, wherein the flow rates of the refrigerants supplied to each of the heat exchangers and the

temperature and the flow rate of the liquefied natural gas product stream are controlled by the method according to any one of the claims 1-14, and wherein the flow rate of one of the refrigerants referred to in step d) is the sum of the flow rates of this refrigerant to the heat exchangers, which method further comprises the steps of:

1) allowing the liquefied natural gas from each of the heat exchangers to pass through a conduit provided with a flow control valve, and measuring the two flow rates of the liquefied natural gas flowing through the conduits;

2) fully opening the flow control valves, selecting the valve through which, when fully opened, the flow rate of the liquefied natural gas is smallest, and keeping that valve at its fully opened position;

3) determining a dependent set point for the flow rate of the liquefied natural gas flowing through the conduit provided with the other valve such that this flow rate equals the measured flow rate of the liquefied natural gas flowing through the conduit provided with the valve at its fully opened position; and

4) maintaining the flow rate of the liquefied natural gas from the second heat exchanger at its dependent set point.

16. The method according to claim 15, wherein step 3) comprises determining a dependent set point for the flow rate of the natural gas flowing through the conduit provided with the other valve using the measured flow rates of the liquefied natural gas from the first and second heat exchangers, the flow rates of one of the refrigerants supplied to the heat exchangers, and an operator manipulated set point for the quotient of (i) the ratio of the flow rate of the liquefied natural gas leaving the first heat exchanger to the flow rate of one of the refrigerants supplied to the first heat exchanger and (ii) the ratio of the flow rate of the liquefied

natural gas leaving the second heat exchanger to the flow rate that refrigerant supplied to the second heat exchanger.

17. The method according to claim 15, wherein steps 2), 3) and 4) comprise comparing the measured temperature of the liquefied natural gas from the first heat exchanger to the temperature of the liquefied natural gas from the second heat exchanger; determining the stream having the highest temperature; maintaining the flow rate of the liquefied natural gas stream having the lowest temperature at its operator manipulated set point; determining a dependent set point for the flow rate of the stream having the highest temperature, so as to decrease the temperature of that liquefied natural gas stream; and maintaining the flow rate of that stream at its dependent set point.